

**CLAIMS:**

1. An inorganic, quasi-amorphous oxide compound of a metal, mixture of metals or semiconducting element, said compound having pyroelectric properties.

2. The compound of claim 1 having the formula  $(A_xB_{1-x})_pO_n$ , wherein A and B are independently selected from transition metals, elements of Group IVA of the periodic table, alkali metals, alkali earth metals and rare earth metals; x has values of between 0 to 1; p is an integer having the values 1, 2 or 3; and n is an integer having the value of 1, 2, 3 or 4.

3. The compound of claim 2, wherein A is a transition metal or an element of Group IVA of the periodic table, x is 1 and p is 2.

4. The compound of claim 1, having the formula  $(A_xB_{1-x})(C_yD_{1-y})O_n$  wherein A and B are independently selected from alkali metals, alkali earth metals, rare earth metals and elements of Group IVA of the periodic table; C and D are independently selected from transition metals and alkali earth metals; x and y have values of between 0 to 1; and n is an integer having the value of 1, 2 or 3.

5. The compound of claim 4, wherein A and B are independently selected from Ba, Sr, Ca, Pb, La, Eu, Li, Na, K and Cs; C and D are independently selected from Ti, Zr, Nb, Ta, Sc, Mg and V; and n is 3.

6. The compound of claim 5, wherein A and B are independently selected from Ba, Sr, Ca, Pb, La and Eu.

7. The compound of claim 5, wherein A and B are independently selected from Li, Na, K and Cs.

8. The compound of claim 5, wherein C and D are independently selected from Ti and Zr.

9. The compound of claim 6, wherein C and D are independently selected from Ti and Zr.

10. The compound of claim 7, wherein C and D are independently selected from Ti and Zr.

- 17 -

11. The compound of claim 5, wherein C and D are independently selected from Nb, Ta, Sc, Mg and V.

12. The compound of claim 6, wherein C and D are independently selected from Nb, Ta and V.

5 13. The compound of claim 7, wherein C and D are independently selected from Nb, Ta and V.

14. The compound of claim 4, wherein  $y=0$  and having the formula  $(A_xB_{1-x})DO_3$ , wherein A, B, D and x are as defined in claim 4.

10 15. The compound of claim 4 having a pyroelectric coefficient of between about  $10^{-12}$  C/(cm<sup>2</sup> x K) and about  $10^{-7}$  C/(cm<sup>2</sup> x K).

16. The compound of claim 14 having a pyroelectric coefficient of between about  $10^{-12}$  C/(cm<sup>2</sup> x K) and about  $10^{-7}$  C/(cm<sup>2</sup> x K).

17. The compound of claim 4 selected from BaTiO<sub>3</sub>, CaTiO<sub>3</sub>, PbTiO<sub>3</sub>, Pb(ZrTi)O<sub>3</sub>, Pb(Zr<sub>0.35</sub>Ti<sub>0.65</sub>)O<sub>3</sub>, (PbCa)TiO<sub>3</sub>, (PbLa)(ZrTi)O<sub>3</sub>, PbLaTiO<sub>3</sub>,  
15 Pb(ScTa)O<sub>3</sub>, Pb(ScNb)O<sub>3</sub>, Pb(MgNb)O<sub>3</sub>, SrTiO<sub>3</sub>, (Sr<sub>0.65</sub>Ba<sub>0.35</sub>)TiO<sub>3</sub>, (Ba<sub>0.70</sub>Sr<sub>0.30</sub>)TiO<sub>3</sub> and EuTiO<sub>3</sub>.

18. The compound of claim 17 having a pyroelectric coefficient of between about  $10^{-12}$  C/(cm<sup>2</sup> x K) and about  $10^{-7}$  C/(cm<sup>2</sup> x K).

19. The compound of claim 17 being selected from BaTiO<sub>3</sub>, PbTiO<sub>3</sub> and  
20 SrTiO<sub>3</sub>.

20. The compound of claim 18 being BaTiO<sub>3</sub>.

21. A process for preparing pyroelectric compound, comprising applying a mechanical strain to a substantially amorphous compound of the formula  $(A_xB_{1-x})(C_yD_{1-y})O_n$  as defined in claim 4, said mechanical strain being controlled so as to  
25 prevent crystallization of said compound, thereby obtaining inorganic quasi-amorphous compound having pyroelectric properties.

22. The process of claim 21, wherein said mechanical strain is obtained by a temperature gradient.

- 18 -

23. The process of claim 21, wherein said amorphous compound has the formula  $(A_xB_{1-x})DO_3$ , wherein A, B, D and x have the meanings as defined in claim 14.

24. Inorganic quasi-amorphous compound of the formula  $(A_xB_{1-x})(C_yD_{1-y})O_3$  as defined in claim 14 preparable by the process of claim 21.

25. A device comprising the compound according to claim 1 in the form of a film coating on a substrate.

26. A device comprising the compound according to claim 4 in the form of a film coating on a substrate.

27. The device of claim 26, wherein the substrate is selected from Si,  $SiO_2$  and glass.

28. The device of claim 27, wherein the thickness of the coating layer is below 0.5 micron.

29. A device comprising the compound of claim 1, the device being operable as a sensor for sensing an external field including at least one of the following: temperature field, magnetic field and electric field.

30. A device comprising the compound of claim 4, the device being operable as a sensor for sensing an external field including at least one of the following: temperature field, magnetic field and electric field.

31. A device having an acoustic wave propagation element including the compound of claim 1.

32. A device having an acoustic wave propagation element including the compound of claim 4.

33. A device having an acoustic wave propagation element including the compound of claim 5.

34. A birefringent medium comprising the compound of claim 1.

35. A birefringent medium comprising the compound of claim 4.

36. A device comprising the compound according to claim 1.

37. A device comprising the compound according to claim 4.

- 19 -

38. A device comprising a compound according to claim 3 in the form of a film coating on a substrate.

39. The device of claim 38, wherein the substrate is selected from Si, SiO<sub>2</sub> and glass.

5 40. The device of claim 39, wherein the compound is SiO<sub>2</sub>.